REMARKS

Entry of the foregoing and reconsideration of the application identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.111 and in light of the remarks which follow, are respectfully requested.

By the above amendments, claims 7-14 which are directed to non-elected inventions, have been canceled without prejudice or disclaimer. Claim 1 has been amended for clarification purposes by replacing the word "midpoint" with "point". Claim 1 has also been amended for clarification purposes to recite that "the screw comprises a first stage and a second stage, and wherein the screw moves forward and backward in the cylinder". Claim 1 has been amended for readability purposes to recite the phrases "to the cylinder at a point" and "a point determined by".

Claim 1 has also been amended for clarification purposes by reciting that "a hollow area in which there is no resin, is present at the second stage of the screw, and wherein the foaming agent is supplied to the hollow area." Support for this amendment can be found in the specification at least at page 16, lines 18-24, taken in connection with FIG. 2. Claim 1 has further been amended for clarification purposes by replacing the phrase "low pressure including practically atmosphere pressure" with "a predetermined pressure".

Claim 23 has been amended to correct a typographical error by replacing the word "of" with "or." Claims 27-29 have been amended for clarification to depend from claim 25.

In the Official Acton at page 3, the Patent Office has required Applicants to affirm the election of invention Group I. In response thereto, Applicants hereby affirm the election to prosecute invention Group I, claims 1, 2 and 17-31, in the present application.

Claims 1, 2 and 17-31 stand rejected under 35 U.S.C. §112, second paragraph, for the reasons set forth at pages 3 and 4 of the Official Action. Withdrawal of this rejection is respectfully requested for at least the following reasons.

The Patent Office has asserted that the phrase "to a length nine times the outside diameter of the screw in the direction of injection" renders claim 1 indefinite. Without addressing the propriety of this rejection, it is noted that claim 1 has been amended for readability purposes to recite the phrase "to a point determined by nine times the outside diameter of the screw in the direction of injection". Claim 1 has also been amended in accordance with the Examiner's suggestion by adding the phrase "to the cylinder" after "foaming agent".

In view of the above, it is apparent that claim 1 complies with the provisions set forth in the second paragraph of 35 U.S.C. §112. Accordingly, withdrawal of the §112, second paragraph, rejection is respectfully requested.

Claims 1, 2, 19, 21, 23 and 25-31 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 4,783,292 (*Rogers*). Claims 17, 18, 20, 22 and 24 stand rejected under 35 U.S.C. §103(a) as being obvious over *Rogers* and further in view of U.S. Patent No. 4,393,017 (*Kim et al*). Withdrawal of the above rejections is respectfully requested for at least the following reasons.

According to one aspect of the present invention as defined by claim 1, a process is provided for injection-foaming a thermoplastic resin using an injection molding machine having a two-stage compression screw within a cylinder and to which a physical foaming agent is fed at a point of the cylinder. The screw comprises a first stage and a second stage, and the screw moves forward and backward in the cylinder. The process comprises: (1) feeding the physical

foaming agent into the cylinder from a storage tank at a pressure lower than storage pressure by a pressure difference between the storage tank and the injection molding machine cylinder; (2) feeding the foaming agent to the cylinder at a point within a range from the starting point of the second stage of the screw to a point determined by nine times the outside diameter of the screw in the direction of injection at the time the screw is caused to advance most forward in the direction of injection, wherein a hollow area in which there is no resin, is present at the second stage of the screw, and wherein the foaming agent is supplied to the hollow area; and (3) obtaining a foam by reducing the pressure in a cavity of the mold in the injection molding machine to a predetermined pressure, injecting the resin into the cavity, and then expanding the volume of the cavity.

Rogers discloses an apparatus that can be used to form a plastic foam article (col. 2, lines 36-38). *Rogers* also discloses a mechanism comprising a tubular housing having a port communicating with a liquid polymer source (col. 2, lines 52-54). An extruder screw is rotatably driven by a motor to move the liquid polymer in a left-to-right direction through an annular passage (col. 2, lines 54-56). Large numbers of small circular openings are formed through an annular wall, such that the pressurized gas is discharged from the chamber into the passage as a large number of discrete gas jets (col. 3, lines 8-11).

Rogers does not disclose or suggest each feature of one aspect of the present invention as defined by claim 1. For example, *Rogers* does not disclose or suggest that a hollow area in which there is no resin, is present at a second stage of a screw, and wherein a foaming agent is supplied to the hollow area, as recited in claim 1. By comparison, *Rogers* discloses introducing a gaseous blowing agent to penetrate into a polymer surface to form discrete gas bubbles (col. 3, lines 11-

14). Clearly, *Rogers* has no recognition or suggestion of supplying a foaming agent to a hollow area in which there is no resin, that is present at a second stage of a screw. In fact, *Rogers* does not even mention the presence of a hollow area in which there is no resin at the second stage of the screw, let alone supplying a foaming agent thereto.

Xu fails to cure each of the above-described deficiencies of *Rogers*. As acknowledged at page 4 of the Official Action, *Rogers* does not disclose or suggest a screw that moves forward and backward in the cylinder, as is now recited in claim 1. In this regard, the Patent Office has relied on U.S. Patent No. 6,322,347 (*Xu*) for disclosing a reciprocating screw. However, like *Rogers*, *Xu* does not disclose or suggest that a hollow area in which there is no resin, is present at the second stage of the screw, and wherein the foaming agent is supplied to the hollow area, as recited in claim 1. Moreover, it is well established that there must be some suggestion or motivation to modify a reference or to combine reference teachings. See M.P.E.P. §2143. In the present case, the Patent Office has not provided any reason why one of ordinary skill in the art would have been motivated to modify *Rogers* to incorporate the reciprocating screw disclosed by *Xu* therein.

Kim et al also fails to cure each of the above-described deficiencies of *Rogers*. In this regard, the Patent Office has relied on *Kim et al* for disclosing an extruder screw having particular screw depths (Official Action at page 6). However, like *Rogers*, *Kim et al* does not disclose or suggest that a hollow area in which there is no resin, is present at the second stage of the screw, and wherein the foaming agent is supplied to the hollow area, as recited in claim 1.

For at least the above reasons, it is apparent that no *prima facie* case of obviousness exists. Accordingly, withdrawal of the above §103(a) rejections is respectfully requested.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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Date: March 1, 2004